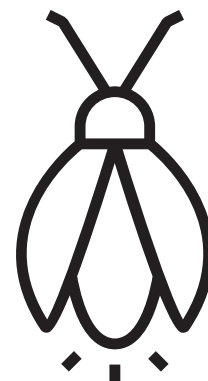


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NORTHVOLT CASE STUDY

# European battery manufacturer plugs into the power of ABB

Jumpstarting next-generation battery cell production at Northvolt




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## The Situation

The Energy Revolution is in high gear. Communities, companies, and entire countries are working together to develop and use renewable energy sources to lower the world's reliance on fossil fuels.

Developing ways of sustainable transport plays a key role. Since electrification of transportation is especially critical to realizing a carbon neutral society, the need for more efficient batteries is more crucial than ever.

To meet this surging demand, European battery manufacturer Northvolt set out to build the world's greenest battery to enable the European transition to renewable energy.

By plugging into the power of ABB, this enterprising industry disruptor is on a mission to not only produce next-generation battery cells, but to "make oil history."



## The Challenge

A key milestone in achieving their goal was to complete the construction of their first gigafactory, Northvolt Ett in Skellefteå, Sweden.

The Northvolt team needed an industry partner who could fast-track and scale electrification and automation solutions to what will be Europe's largest and most advanced lithium-ion battery gigafactory. And most importantly, they needed a capable, dependable partner from the project's inception that could support them every step of the way.

**"The world is moving quickly towards electrification. ABB is at the forefront of the electrification, and we are delighted to have them on-board as strategic partner, key supplier and investor."**

Peter Carlsson, CEO of Northvolt



### Partners with ABB

In September 2017, ABB becomes Northvolt's first partner. Northvolt selects Västerås, the hometown of ABB Sweden, as the location for the company's R&D campus covering the entire battery ecosystem.



### Work begins on first gigafactory

One year later, Northvolt Ett, Northvolt's groundbreaking gigafactory, begins construction in Skellefteå, a town about 500 miles north of Stockholm. When fully built, the plant's production capacity will be 60 gigawatt hours (GWh), which would supply batteries for approximately one million electric vehicles annually.



### Sustainability focused

Only renewable energy from hydropower and wind power is used to power the plant, demonstrating that Northvolt's production process is as sustainable as the product it makes.

Throughout 2022, Northvolt Ett will make deliveries to customers at the leading edge of the transition to a fully electric vehicle fleet.

2017

2018

2022

## The Solution

Northvolt chose ABB as their partner to help fast-track project execution with integrated electrification, instrumentation, control, and digitalization (EICD) solutions that would also enable efficient start-up as well as operations.

The partnership was solidified because ABB was able to effectively collaborate right from the start, participating in the concept design before capital expenditure decisions were made—minimizing complexities, de-risking the project, and gaining consensus on priorities to conserve budget and preserve schedules.

### From start to finish, ABB Plant Optimization Methodology provides an evolution in project design and execution.

Key to this success was the ability to engage early and collaborate closely with all parties in the design phase, covering multiple disciplines and fast-tracking engineering. This enabled ABB's Plant Optimization Methodology to be fully leveraged, ensuring effective, efficient project planning execution and lifecycle management.

The scope of supply included ABB Ability™ System 800xA, ABB Power Management System, instrumentation, electrification, and other industry-leading technologies, which due to ABB's integrated EICD offering and common platform, enabled ABB to reduce project delivery time by applying Adaptive Execution™ project delivery. This optimized project schedule, costs, and flexibility.

#### Take a closer look at ABB Plant Optimization Methodology:

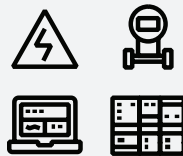


ABB combines disciplines such as Electrical, Instrumentation, Control, and Digital solution within the same foundational platform to minimize risk, reduce interface complexity, and leverage synergies of scale to provide an integrated, fully optimized solution that carries through all phases of project execution



ABB Adaptive Execution redefines physical and digital activities to deliver consistent, standardized global projects with even more flexibility and compressed schedule opportunities



This is followed by ABB's ongoing operations support for production optimization, training and education, spare parts inventory organization, and lifecycle management—ensuring reliable, efficient, and safe operations for greater productivity and profitability

## The Outcomes

ABB demonstrated the flexibility and expertise needed to solve unexpected project challenges.

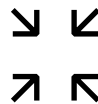
As an EICD partner with an integrated offering and proven project execution model, ABB delivers on time and on budget—successfully supporting Northvolt's most desirable results.

Examples of positive project outcomes include:



### Fluidity in managing scope changes while maintaining budgets

- Project delivery model allowed for scope adjustments with no or limited cost impacts
- Enabled the project to incorporate design changes due to new technological advancements in the industry while maintaining the time schedule
- Electrification flexibility and adaptability enabled the provision of transformers and switchgear as required



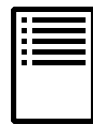
### Compressed schedule

- Modularization: Offsite pre-configuration and pre-assembly for more efficient installation and commissioning, decreased safety risks with less working hours spent on site
- Use of Select I/O enabled de-coupled hardware and software engineering and project tasks
- Optimized control integration streamlined interfaces and reduced complexity



### Flexibility for reprioritization

- Thanks to ABB's flexible project model, activities were reprioritized to mitigate project delays
- Instrumentation agility and parallel-path automation design maximized project efficiency



### ABB scope included among others:

- Main transformers
- 33kV GIS switchgear
- Low-voltage switchgear
- Distribution transformers
- +5,000 pieces of instrumentation
- ABB Ability™ System 800xA distributed control system consisting of 27,000 I/O
- Extended Operator Workstation (EOW)



## Conclusion

**“The success of this project was in large part due to the early stage collaboration with ABB in design and engineering, which helped find ways to save time and money. Looking ahead, the foundation of ABB’s integrated solutions will enable faster training for start-up and eventual onboarding.”**

Patricia O'Carroll  
Group Construction Senior Engineering  
Manager, Northvolt

**“From the beginning, ABB demonstrated their dedication to our efforts and commitment to work side-by-side with us to achieve the best possible project outcomes. As a true partner in electrification, instrumentation, control, and digitalization we are looking forward to exploit together with ABB the full potential of innovation and smart solutions that enable fast-track project completion and optimize our ongoing operations.”**

Stefano Piscitelli  
Vice President Construction, Northvolt

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**ABB AB**  
P.O. Box 4 SE-16493 Kista  
Sweden  
Tel: +46 8 477 90 00

[new.abb.com/battery](https://new.abb.com/battery)